

**REMARKS**

In view of the above amendments and the following remarks, reconsideration of the application is respectfully requested. Claims 1 and 2 are presently pending in the application. Claims 3-5 have been canceled. Claims 1 and 2 have been amended to clarify the invention. No new matter has been added.

The Office asserts that under 35 U.S.C. § 102(b), claim 1 is anticipated by Japanese Patent Application No. 5-243890 to Koyoma, and that under 35 U.S.C. § 103(a), claims 2-5 are unpatentable over Koyoma “in view [of] routine skill in the art.”

Claim 1 now recites a An SC cut crystal resonator that includes a surface of a quartz crystal orthogonal to a Y axis thereof that is rotated through 33° to 35° about an X axis, and is then rotated from this rotated position through 22° to 24° about a Z axis. A slender quartz crystal blank oblong in an X' axis direction is cut from the rotated surface, and an end surface of the quartz crystal blank orthogonal to a Z' axis has a tilt angle tilted in a direction rotated through a predetermined angle about the X' axis. The tilt angle is between -7° and -13°. Claim 2 recites a SC cut crystal resonator as described in claim 1, with a tilt angle between 7° and 13°.

Koyoma fails to disclose or suggest each element of either independent claim 1 or 2. For example, Koyoma does not disclose or suggest a tilt angle that is between either 7° and 13° or -7° and -13°. The Office argues that it “would have been obvious to one having ordinary skill in the art to employ the claimed angles in the device of Koyoma at the time of his invention since he does not note any limitation on the cut angle and it has been held that where the general conditions of a claim are disclosed in the prior [art] discovering the optimum or workable ranges involves only routine skill in the art.” As support for this proposition, the Office cites to *In re Aller*, 220 F.2d 454 (C.C.P.A. 1955).

Applicants respectfully submit that the Office's reliance on the conclusory statement from *Aller* as a *per se* obviousness rule is improper. In *Aller*, the patentee sought to patent a process for treating isopropyl benzene hydroperoxide with sulphuric acid to increase the yield of phenol and acetone. The process was identical to a process disclosed in the prior art, except that the claims specified lower temperatures and higher sulphuric acid concentrations than were shown in the prior art references. *See Aller*, 220 F.2d at 455. The Court of Customs and Patent Appeals indicated that a change in temperature or concentration would normally be an unpatentable modification, but might impart patentability to a process "if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art." *Id.* at 456. The court then went on to say that the prior art disclosed generally the process of decomposition of isopropyl benzene hydroperoxide by sulphuric acid, with the production of phenol and acetone, describing one experiment and its results, and making no indication that this was the maximum yield obtainable. *Id.* at 459. The court concluded that any chemist reading the article could logically assume that higher yields might be obtainable, and by experimentally varying the conditions of temperature and acidity could find the most productive conditions. *Id.* The court held that no invention was involved in "discovering optimum ranges of a process by routine experimentation." *Id.*

The facts in *In re Aller* are not sufficiently similar to the present facts to warrant a blanket application of the court's decision to this case. The Federal Circuit has made it clear that the "use of *per se* rules, while undoubtedly less laborious than a searching comparison of the claimed invention—including all its limitations—with the teachings of the prior art, flouts section 103 and the fundamental case law applying it." *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995). *Per se* rules that eliminate the need for fact-specific analysis of claims and prior art

may be administratively convenient, but “reliance on *per se* rules of obviousness is legally incorrect and must cease.” *Id.* A patentee is entitled to issuance of a patent unless the Office establishes that the invention as claimed in the application is obvious over cited prior art, based on the specific comparison of that prior art with each of the claim elements. *Id.*

The Office has not provided any evidence showing that the tilt angles recited in both independent claims 1 and 2 would have been discovered by one of ordinary skill in the art using only routine experimentation. Unlike *In re Aller*, this case does not involve simply changing the concentration or temperature of ingredients in a chemical composition. The physical structure of the claimed SC resonator is distinct from the physical structure disclosed in Koyama. As indicated in the specification of the present application, the claimed structure produces new and unexpected results, including suppression of B mode vibration and reliable excitation of C mode vibration in the crystal resonator. *See* Specification, page 5, lines 3-7. One of ordinary skill in the art would not be able to derive the claimed tilt angles by routine experimentation.

Koyama simply does not disclose or suggest an SC cut crystal resonator with tilt angles between  $-7^{\circ}$  and  $-13^{\circ}$ , as recited in claim 1, or between  $7^{\circ}$  and  $13^{\circ}$ , as recited in claim 2. The Office argues that Koyama “does not note any limitation on the cut angle.” Assuming this were true, it would not be proper for the Office to reject the claims based on Koyama alone; the reference does not disclose every element of the claims, and the Office has not provided any additional supporting evidence or reasoning showing why the claimed tilt angles would have been obvious. Koyama indicates that the end face of the crystal piece it discloses is obliquely cut parallel to a plane formed by the XX' and Z axes. *See* Koyama – Abstract, Claims, paragraphs [0005], [0006]. In other words, Koyama discloses a *specific* angle for the end face—an angle that is much greater than the claimed range of  $7^{\circ}$  to  $13^{\circ}$  or  $-7^{\circ}$  to  $-13^{\circ}$ . There is no way that a

person of ordinary skill in the art would arrive at the claimed invention simply by reading the disclosure of Koyama. Consequently, both independent claim 1 and independent claim 2 are patentable over Koyama.

### **CONCLUSION**

Applicants submit that each of the pending claims in the application is directed to patentable subject matter. Allowance of the claims is respectfully requested.

The Director is hereby authorized to charge any additional fees required to be filed with this paper (or with any other paper filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 64719(51379)

Respectfully submitted,

Date: January 8, 2010

/Jacob P. Martinez #57924/

---

Jacob P. Martinez, Reg. No. 57,924  
Attorney for Applicants

EDWARDS ANGELL PALMER & DODGE LLP  
P.O. Box 55874  
Boston, MA 02205  
Tel: (203) 353-6817  
Fax: (866) 658-1067  
Customer No. 21,874